United States
Department of
Agriculture

Agricultural
Marketing
Service

Dairy
Division

United States Standards for Grades of Nonfat Dry Milk (Spray Process)

Effective May 22, 1996

United States Standards for Nonfat Dry Milk (Spray Process)[1]

Definitions

§ 58.2525 *Nonfat dry milk.*

(a) "Nonfat dry milk" is the product obtained by the removal of only water from pasteurized skim milk. It contains not more than 5 percent by weight of moisture and not more than 1½ percent by weight of milkfat and it conforms to the applicable provisions of 21 CFR part 131 "Milk and Cream" as issued by the Food and Drug Administration. Nonfat dry milk covered by these standards shall not contain nor be derived from dry buttermilk, dry whey, or products other than skim milk, and shall not contain any added preservative, neutralizing agent, or other chemical.

U.S. Grades

§ 58.2526 *Nomenclature of U.S. grades*.

The nomenclature of U.S. grades is as follows:

(a) U.S. Extra.

(b) U.S. Standard.

§ 58.2527 *Basis for determination of U.S. grade***.**

(a) The U.S. grade of nonfat dry milk is determined on the basis of flavor, physical appearance, bacterial estimate on the basis of standard plate count, milkfat content, moisture content, scorched particle content, solubility index, and titratable acidity.

(b) The final U.S. grade shall be established on the basis of the lowest rating of any one of the quality factors.

§ 58.2528 *Specifications for U.S. grades*.

(a) *U.S. Extra Grade*. U.S. Extra Grade nonfat dry milk shall conform to the following requirements (See Tables I, II, and III of this section):

[1]Compliance with these standards does not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.

(1) *Flavor*. Reconstituted nonfat dry milk shall possess a sweet, pleasing, and desirable flavor, but may possess the following flavors to a slight degree: Chalky, cooked, feed, or flat. See Table I of this section.

(2) *Physical appearance*. Nonfat dry milk shall possess a uniform white to light cream natural color. It shall be free from lumps, except those that readily break up with slight pressure, and be practically free from visible dark particles. The reconstituted product shall be free from graininess. See Table II of this section.

(3) *Bacterial estimate*. Not more than 40,000 per gram standard plate count. See Table III of this section.

(4) *Milkfat content*. Not more than 1.25 percent. See Table III of this section.

(5) *Moisture content*. Not more than 4.0 percent. See Table III of this section.

(6) *Scorched particle content*. Not more than 15.0 mg. See Table III of this section.

(7) *Solubility index*. Not more than 1.2 ml., except that product classified as U.S. High-heat may have not more than 2.0 ml. See Table III of this section.

(8) *Titratable acidity*. Not more than 0.15 percent (lactic acid). See Table III of this section.

(b) *U.S. Standard Grade*. U.S. Standard Grade nonfat dry milk shall conform to the following requirements (See Tables I, II, and III of this section):

(1) *Flavor*. Reconstituted nonfat dry milk shall possess a fairly pleasing flavor, but may possess the following flavors to a slight degree: Bitter, oxidized, scorched, storage, or utensil; the following to a definite degree: Chalky, cooked, feed, or flat. See Table I of this section.

(2) *Physical appearance*. Nonfat dry milk may possess a slight unnatural color. It shall be free from lumps, except those that break readily under moderate pressure, and be reasonably free from visible dark particles. The reconstituted product shall be reasonably free from graininess. See Table II of this section.

(3) *Bacterial estimate.* Not more than 75,000 per gram standard plate count. See Table III of this section.

(4) *Milkfat content.* Not more than 1.50 percent. See Table III of this section.

(5) *Moisture content.* Not more than 5.0 percent. See Table III of this section.

(6) *Scorched particle content*. Not more than 22.5 mg. See Table III of this section.

(7) *Solubility index*. Not more than 2.0 ml., except that product classified as U.S. High-heat may have not more than 2.5 ml. See Table III of this section.

(8) *Titratable acidity*. Not more than 0.17 percent (lactic acid). See Table III of this section.

Table I.--Classification of Flavor With Corresponding U.S. Grade

Flavor characteristics	U.S. extra grade	U.S. standard grade
Bitter	-	S
Chalky	S	D
Cooked	S	D
Feed	S	D
Flat	S	D
Oxidized	-	S
Scorched	-	S
Storage	-	S
Utensil	-	S

- = Not permitted S = Slight D = Definite

Table II.--Classification of Physical Appearance With Corresponding U.S. Grade

Physical appearance characteristics	U.S. extra grade	U.S. standard grade
Dry Product:		
Lumpy	Slight	Moderate.
Unnatural color	-	Slight.
Visible dark particles	Practically free	Reasonably free.
Reconstituted Product:		
Grainy	-	Reasonably free.

- = Not permitted

Table III - Classification According to Laboratory Analysis With Corresponding U.S. Grade

Laboratory tests	U.S. extra grade	U.S. standard grade
Bacterial estimate; Standard plate count; per gram (max)	40,000	75,000
Milkfat content; percent (max)	1.25	1.50
Moisture content; percent (max)	4.0	5.0
Scorched particle content; mg (max)	15.0	22.5
Solubility index; ml (max) U.S. High-heat (max)	1.2 2.0	2.0 2.5
Titratable acidity (lactic acid); percent (max)	0.15	0.17

§ 58.2529 *U.S. grade not assignable***.**

Nonfat dry milk shall not be assigned a U.S. grade for one or more of the following reasons:

(a) The nonfat dry milk fails to meet or exceed the requirements for U.S. Standard Grade.

(b) The nonfat dry milk has a direct microscopic clump (DMC) count exceeding 100 million per gram.

(c) The nonfat dry milk has a coliform count exceeding 10 per gram.

(d) The nonfat dry milk is produced in a plant that is rated ineligible for USDA grading service or is not USDA-approved.

§ 58.2532 *Test methods***.**

All required tests shall be performed in accordance with DA Instruction No. 918-RL, "Instruction for Resident Grading Quality Control Service Programs and Laboratory Analysis," Dairy Grading Branch, Dairy Division, Agricultural Marketing Service, U.S. Department of Agriculture, Washington, DC 20090-6456; the latest revision of "Official Methods of Analysis of the Association of Official Analytical Chemists"; or the latest edition of "Standard Methods for the Examination of Dairy Products", available from the American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC 20005.

Explanation of Terms

§ 58.2537 *Explanation of terms***.**

(a) *With respect to flavor*:
(1) *Slight*. Detected only upon critical examination.
(2) *Definite*. Not intense but detectable.
(3) *Bitter*. Distasteful, similar to the taste of quinine.
(4) *Chalky*. A tactual type of flavor lacking in characteristic milk flavor.
(5) *Cooked*. Similar to a custard flavor and imparts a smooth aftertaste.
(6) *Feed*. Feed flavors (such as alfalfa, sweet clover, silage, or similar feed) in milk carried through into the nonfat dry milk.
(7) *Flat*. Insipid, practically devoid of any characteristic reconstituted nonfat dry milk flavor.
(8) *Oxidized*. A flavor resembling cardboard and sometimes referred to as "cappy" or "tallowy".
(9) *Scorched*. A more intensified flavor than "cooked" and imparts a burnt aftertaste.
(10) *Storage*. Lacking in freshness and imparting a "stale" aftertaste.
(11) *Utensil*. A flavor that is suggestive of improper or inadequate washing and sanitation of milking machines, utensils, or manufacturing equipment.

(b) *With respect to physical appearance*:
(1) *Practically free*. Present only upon very critical examination.
(2) *Reasonably free*. Present only upon critical examination.
(3) *Slight pressure*. Only sufficient pressure to disintegrate the lumps readily.
(4) *Moderate pressure*. Only sufficient pressure to disintegrate the lumps easily.
(5) *Grainy*. Minute particles of undissolved powder appearing in a thin film on the surface of a glass or tumbler.
(6) *Lumpy*. Loss of powdery consistency but not caked into hard chunks.
(7) *Natural color*. A color that is white to light cream.
(8) *Unnatural color*. A color that is more intense than light cream and is brownish, dull, or grey-like.
(9) *Visible dark particles*. The presence of scorched or discolored specks.

Supplement to U.S. Standards for Grades of Nonfat Dry Milk (Spray Process): U.S. Heat Treatment Classification

§ 58.2538 *Basis for obtaining heat treatment classification***.**

Heat treatment classification is not a U.S. grade requirement except in cases when the higher solubility index specified for U.S. High-heat product is permitted. In all other instances, product submitted for USDA grading may be analyzed for heat treatment classification upon

request and the results shown on the grading certificate. Heat treatment classification will be made available only upon a product graded by USDA.

§ 58.2339 *Nomenclature of U.S. Heat Treatment Classification.*

The nomenclature of U.S. Heat Treatment Classification is as follows:

(a) U.S. High-heat.

(b) U.S. Medium-heat.

(c) U.S. Low-heat.

§ 58.2540 *Basis for determination of U.S. Heat Treatment Classification.*

The whey protein nitrogen test shall be used in determining the heat treatment classification as follows:

(a) *U.S. High-heat*. The finished product shall not exceed 1.50 mg. undenatured whey protein nitrogen per gram of nonfat dry milk.

(b) *U.S. Medium-heat*. The finished product shall exceed 1.50 mg. undenatured whey protein nitrogen per gram of nonfat dry milk and shall be less than 6.00 mg. undenatured whey protein nitrogen per gram of nonfat dry milk.

(c) *U.S. Low-heat*. The finished product shall be not less than 6.00 mg. undenatured whey protein nitrogen per gram of nonfat dry milk.

§ 58.2541 *Test method; whey protein nitrogen.*

The whey protein nitrogen test shall be performed in accordance with DA Instruction 918-RL, "Instruction for Resident Grading Quality Control Service Programs and Laboratory Analysis," Dairy Grading Branch, Dairy Division, Agricultural Marketing Service, U. S. Department of Agriculture, Washington, DC, 20090-6456, or the latest edition of "Standard Methods for the Examination of Dairy Products," available from the American Public Health Association, 1015 Fifteenth Street, NW., Washington, DC 20005.